

REMARKS

The Office Action of April 1, 2003 has been reviewed and the Examiner's comments carefully considered. Claims 30-61 are currently pending in this application. Claims 30-61 have been cancelled. Claims 62-72 have been added. Support for the recitation "at least two copies" can be found on page 14, line 18. Support for the recitation "nucleotides 153-3258 of RNA1" can be found on page 12, line 27. Support for the recitation "3' truncated sequence of BNYVV" can be found on page 11, lines 30-31 and page 12, lines 25-32. Support for the recitation "transgenic sugar beet plant" can be found on page 4, line 17. No new subject matter has been added by this amendment. In view of the amendments and the following explanation, Applicants believe that all the asserted rejections are in condition for withdrawal and all the claims are in condition for allowance.

The Examiner points out that Figure 2 in the specification does not refer to parts A and B. Figure 2 in the specification has been amended to recite "Figure 2 A-B."

Claims 30 and 53 stand objected to under 37 C.F.R. 1.75(b) as being duplicate claims. Claims 30 and 53 have been cancelled, and it is believed that any parallel claim duplication has been avoided.

Claims 45-52 and 54-57 stand rejected under 35 U.S.C. 101 as being directed to non-statutory subject matter. Claims 45-52 and 54-57 have been cancelled, thus mooting this rejection. As suggested by the Examiner, new claims 65-72 recite the term "transgenic" in connection with the claimed plant cells, plants and plant parts.

Claims 32-57, 60, and 61 stand rejected under 35 U.S.C. 112, second paragraph, for asserted indefiniteness. The Examiner asserts that in claims 32-36, 40-44, and 47-51, "it is not clear to which nucleotide sequence of the RNA1 of which BNYVV isolate the claims are referring to." Claims 30-61 have been cancelled and new claims 62-72 have been added. Applicants respectfully submit that it is clear from Example 1 in the specification that the primer combinations recited therein and used to obtain the cDNA clones of BNYVV for cloning in the transformation vector of the claimed invention are specific primer sequence combinations well known in the art (as previously disclosed by Bouzoubaa et al., page 11, lines 33-36). Indeed, the Bouzoubaa et al. RNA1 BNYVV sequence corresponds to the RNA sequence of Genbank sequence with Accession Number D00115 (revised as

X05147), which has been in the public domain since April 29, 1993, well before the filing date of the present application. Applicants therefore submit that one skilled in the art would have little or no difficulty in ascertaining the particular nucleotide sequence of the RNA1 BNYVV isolate of the claimed invention.

Claims 30-35, 37-43, 45-50, and 52-61 stand rejected under 35 U.S.C. 112, first paragraph, as assertedly lacking a written description. Claims 30-61 have been cancelled and new claims 62-72 have been added. In particular, new claims 62-72 recite at least two copies of a DNA fragment comprised of RNA1 of BNYVV. Support in the specification for this recitation is found in Examples 1 and 2 on pages 11-14, where it is stated that transgenic plants with two or three copies of the cDNA clone corresponding to 153-3258 RNA1 of BNYVV incorporated into the genome of the plant cells were resistant to BNYVV, and that similar results were obtained with transformation techniques other than *Agrobacterium*-mediated transformation. Moreover, as the Examiner acknowledges, the cDNA sequence of the claimed invention is clearly and unambiguously identified in the specification as the primer sequence combination 153-3258 RNA1 of BNYVV (as previously disclosed by Bouzoubaa et al.). Applicants respectfully submit that the need for undue experimentation and lack of guidance are no longer applicable based on the invention as now claimed.

Claims 30-61 stand rejected under 35 U.S.C. 103(a) as assertedly being unpatentable over Baulcombe in view of Saito et al. and Hall et al.

Baulcombe discloses a general teaching of mechanisms for viral resistance in which replicase-mediated resistance plays a small part. Baulcombe, however, does not teach using specific sequences to obtain BNYVV-resistant sugar beet plants, or any other resistant plants, as the Examiner acknowledges. Saito et al. compare nucleotide sequences of the F2 and S isolates of BNYVV, which includes the RNA1 sequence of 6746 nucleotides that is responsible for encoding the viral replicase protein, and assert that BNYVV is responsible for rhizomania disease of sugar beet. Hall et al. teach transformation of sugar beet and plant regeneration.

In contrast to the above, the invention inheres in a method for conveying resistance to BNYVV to a sugar beet plant, in which at least two copies of a DNA fragment of the virus, comprising nucleotides 153-3258 of RNA1 of the virus and operatively linked to a

promoter that is active in the plants, are introduced into a sugar beet plant cell by means of a DNA vector, and regenerating a transgenic sugar beet plant from the transformed sugar beet plant cell. Moreover, the novel critical feature of the claimed invention resides in the use of DNA fragments that are truncated at the 3' end and which *no longer contain the replicase portion* of the replication-associated domains. One skilled in the art is aware that there are three distinct RNA1 ORF (open reading frame) replication-associated domains: 1) a methyl transferase domain, 2) a helicase domain, and 3) a polymerase (or replicase) domain. The DNA fragment that corresponds to 153-3258 of the RNA1 corresponds mainly to the *helicase* portion in which the 3' truncated fragment is missing the replicase portion (as stated in the title of Example 1, which refers to a truncated BNYVV replicase sequence). Furthermore, RNA1 is translated into two proteins of 150 kDa and 66 kDa, respectively. The 150 kDa corresponds to the helicase portion and the 66 kDa corresponds to the replicase part. Cleavage of the 220 kDa precursor protein occurs around position 4770, about 1500 nucleotides upstream from the 153-3258 fragment, thus substantiating that the 3' truncated fragment is missing the replicase portion.

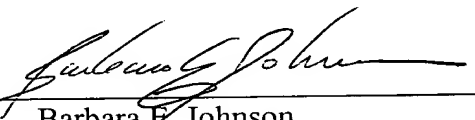
Based on the above, it is clear that neither Baulcombe, Saito et al. or Hall et al., alone or in combination, teach or suggest the use of truncated fragments which mainly contain the RNA1 helicase domain, and not the replicase domain, to confer resistance to BNYVV by the transformation of sugar beet plants. Furthermore, one skilled in the art would not be motivated to combine Baulcombe with Saito et al. and Hall et al. because such a combination does not teach or suggest the critical feature of the present invention of using DNA fragments that are truncated at the 3' end and which do not contain the replicase portion of the replication-associated domains.

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For all the foregoing reasons, new claims 62-72 are patentable over the cited prior art and in condition for allowance. Withdrawal of the asserted rejections and allowance of all pending claims 62-72 is respectfully requested.

Respectfully submitted,

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